

Appl. No. 10/575,000
Response to Office Action mailed June 18, 2007

Atty Dkt. No. 112780-053

AMENDMENTS TO THE SPECIFICATION

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Please amend paragraph [0023] of the specification as follows.

In order to achieve the object, as mentioned in claim 1 of the present invention, there is provided a travel vibration suppressing device of a working vehicle comprising a hydraulic pump, at least one actuator actuated by pressure oil discharged from the hydraulic pump, an accumulator connected to one pressure chamber in the at least one actuator and absorbing a pressure pulsation in the pressure chamber, a directional control valve for controlling the pressure oil supplied from the hydraulic pump to the actuator, and a ride control valve for controlling a communication and a cutoff between the accumulator and the pressure chamber, wherein the ride control valve is arranged on the directional control valve in a laminated manner by an internal piping according to the present invention, there is provided a travel vibration suppressing device disposed in a working vehicle, the travel vibration suppressing device absorbing a pressure pulsation generated in an actuator when the working vehicle is traveling, and comprising: a hydraulic pump; at least one actuator actuated by pressure oil discharged from the hydraulic pump; an accumulator connected to one pressure chamber in the at least one actuator for absorbing a pressure pulsation generated in the pressure chamber; a directional control valve for controlling a supply and a discharge of the pressure oil to the actuator; and a ride control valve for switching a communicating state and a cutoff state between the accumulator and the pressure chamber, wherein the ride control valve is constructed in a ride valve body, the directional control valve is constructed in a bucket valve body, the ride valve body is disposed on the bucket valve body in a laminated manner, the ride control valve and the directional control valve are connected through an internal piping in the ride valve body and the bucket valve body, the travel vibration suppressing device comprises a first pressure sensor for detecting a load pressure of the actuator and a communication opening area of the ride control valve which communicates between the accumulator and the pressure chamber is controlled on a basis of a detected signal from the first pressure sensor.

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Please amend paragraph [0024] of the specification as follows.

Further, in accordance with major characteristics of the present invention, a communication opening area of the ride control valve is controlled by using a pressure sensor for detecting a load pressure of the actuator, and a travel state detecting sensor for detecting a travel state of the working vehicle, a condition at a time of communicating the accumulator and the actuator is set by using a pressure sensor for detecting a pressure of the accumulator, an opening area of an upper limit which can be increased an openable upper limit opening area as the communication opening area of the ride control valve is controlled, a speed increasing valve body comprising a speed increasing valve is disposed on a ride valve body comprising a ride control valve or a bucket valve body comprising a directional control valve in a laminated manner the pressures in the actuator and the accumulator are equalized by using a movable throttle, and a speed increasing valve is arranged on the ride control valve or the directional control valve in a laminated manner.

Please amend paragraph [0029] of the specification as follows.

In accordance with the present invention, as described in claim 2, it is possible to control the communication opening area of the ride control valve on the basis of the detection signal from the pressure sensor and/or the travel state detecting sensor. For example, when the boom equipped in the working vehicle is moved upward on the basis of the vibration generated at a time when the working vehicle travels, it is possible to execute such a control as to widen the communication opening area and to rapidly absorb the pressure oil which becomes high pressure from the bottom chamber of the actuator by the accumulator, thereby suppress a rapid upward movement of the boom.

Please amend paragraph [0031] of the specification as follows.

In accordance with the present invention, as described in claim 3, when the pressure within the accumulator is higher than the load pressure of the actuator, it is possible to connect the accumulator and the actuator after previously reducing the pressure within the accumulator to the load pressure of the actuator instead of connecting the accumulator and the actuator as they are.

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Please amend paragraph [0032] of the specification as follows.

Accordingly, it is possible to prevent the boom from being rapidly moved upward by the pressure from the accumulator, for example, because the pressure within the accumulator is higher than the load pressure in the actuator accumulator, at a time of connecting the accumulator and the actuator.

Please amend paragraph [0033] of the specification as follows.

In accordance with the present invention, as described in claim 4, when an operation for increasing the communication opening area is performed, a valve of an upper limit of an area which can be increased as the communication opening area can be controlled in a case of controlling the communication opening area of the ride control valve up to the upper limit opening area, it is possible to control a value of the upper limit opening area. With regard to the valve of the upper limit opening area, as described in claims 5 and 6, it is possible to control the value of the upper limit opening area depending on the load pressure of the actuator and/or the traveling speed of the working vehicle.

Please delete paragraph [0037] of the specification.

Please amend paragraph [0038] of the specification as follows.

In accordance with the present invention, as described in claim 8, it is possible to arrange the speed increasing valve in a laminated manner in adjacent to the directional control valve or the ride control valve. It is possible to circulate a supply flow rate and a discharge flow rate with respect to the actuator from the speed increasing valve arranged disposed in a laminated manner. Since it is possible to alternatively control part of the flow rate of the pressure oil supplied to and discharged from the actuator by the speed increasing valve, it is possible to mount the travel vibration suppressing device in accordance with the present invention on middle-scaled and large-scaled working vehicles, so as to achieve an excellent vibration suppressing effect.

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Please insert the following paragraph immediately after paragraph [0038] of the specification.

According to the present invention, there is provided a travel vibration suppressing device disposed in a working vehicle, the travel vibration suppressing device absorbing a pressure pulsation generated in an actuator when the working vehicle is traveling, and comprising: a hydraulic pump; at least one actuator actuated by pressure oil discharged from the hydraulic pump; an accumulator connected to one pressure chamber in the at least one actuator for absorbing a pressure pulsation generated in the pressure chamber; a directional control valve for controlling a supply and a discharge of the pressure oil to the actuator; and a ride control valve for switching a communicating state and a cutoff state between the accumulator and the pressure chamber, wherein the ride control valve is constructed in a ride valve body, the directional control valve is constructed in a bucket valve body, the ride valve body is disposed on the bucket valve body in a laminated manner, the ride control valve and the directional control valve are connected through an internal piping in the ride valve body and the bucket valve body, the travel vibration suppressing device comprises a speed increasing valve for increasing a supply amount of the pressure oil from the hydraulic pump to the actuator, the speed increasing valve is constructed in a speed increasing valve body, and the speed increasing valve body is disposed on the ride valve body or the bucket valve body in a laminated manner, the speed increasing valve and the ride control valve or the directional control valve are connected through the internal piping in each body and/or an external piping outside of each body.

Please amend paragraph [0043] of the specification as follows.

The working apparatus 3 comprises a pair of right and left booms 10 pivoted by a pivot shaft 9 of the front frame 5 so as to move up and down, a pair of right and left boom cylinders 11 interposed between the front frame 5 and each of the booms 10 and moving the boom 10 up and down, a bucket 13 rotatably pivoted to each of front end portions of a pair of booms 10, a bucket cylinder 15 interposed between the front frame 5 and the bucket 13 and rotating the bucket 13, and the like. The travel vibration suppressing device 20 is arranged at a position surrounded by a dashed line on the front frame 5 side. The boom cylinder 11 is constituted as one of actuators actuated by the pressure oil supplied from the hydraulic pump 21.